

**Translation**

**PATENT COOPERATION TREATY**

**PCT**

**INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY**  
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference <b>FIN 474 PCT</b>	FOR FURTHER ACTION	See Form PCT/IPEA/416
International application No. <b>PCT/DE2004/001147</b>	International filing date (day/month/year) <b>04.06.2004</b>	Priority date (day/month/year) <b>23.06.2003</b>
International Patent Classification (IPC) or national classification and IPC		
Applicant <b>INFINEON TECHNOLOGIES AG</b>		

<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of <u>8</u> sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input checked="" type="checkbox"/> (sent to the applicant and to the International Bureau) a total of <u>1</u> sheets, as follows:</p> <p><input checked="" type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>																									
<p>4. This report contains indications relating to the following items:</p> <table><tr><td><input checked="" type="checkbox"/></td><td>Box No. I</td><td>Basis of the report</td></tr><tr><td><input type="checkbox"/></td><td>Box No. II</td><td>Priority</td></tr><tr><td><input type="checkbox"/></td><td>Box No. III</td><td>Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</td></tr><tr><td><input type="checkbox"/></td><td>Box No. IV</td><td>Lack of unity of invention</td></tr><tr><td><input checked="" type="checkbox"/></td><td>Box No. V</td><td>Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</td></tr><tr><td><input type="checkbox"/></td><td>Box No. VI</td><td>Certain documents cited</td></tr><tr><td><input checked="" type="checkbox"/></td><td>Box No. VII</td><td>Certain defects in the international application</td></tr><tr><td><input type="checkbox"/></td><td>Box No. VIII</td><td>Certain observations on the international application</td></tr></table>		<input checked="" type="checkbox"/>	Box No. I	Basis of the report	<input type="checkbox"/>	Box No. II	Priority	<input type="checkbox"/>	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability	<input type="checkbox"/>	Box No. IV	Lack of unity of invention	<input checked="" type="checkbox"/>	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement	<input type="checkbox"/>	Box No. VI	Certain documents cited	<input checked="" type="checkbox"/>	Box No. VII	Certain defects in the international application	<input type="checkbox"/>	Box No. VIII	Certain observations on the international application
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Date of submission of the demand	Date of completion of this report																								
Name and mailing address of the IPEA/EP	Authorized officer																								
Facsimile No.	Telephone No.																								

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

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Box No. I

Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language \_\_\_\_\_ which is the language of a translation furnished for the purposes of:
- ☐ international search (Rule 12.3 and 23.1(b))
- ☐ publication of the international application (Rule 12.4)
- ☐ international preliminary examination (Rule 55.2 and/or 55.3)
2. With regard to the elements of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):
- ☐ the international application as originally filed/furnished
- ☒ the description:
- pages 1-15 \_\_\_\_\_ as originally filed/furnished
- pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- ☒ the claims:
- nos. 2-13 \_\_\_\_\_ as originally filed/furnished
- nos.\* \_\_\_\_\_ as amended (together with any statement) under Article 19
- nos.\* 1 \_\_\_\_\_ received by this Authority on 04.04.2005 with letter
- nos.\* \_\_\_\_\_ received by this Authority on of 04.04.2005
- ☒ the drawings:
- sheets 1/6-6/6 \_\_\_\_\_ as originally filed/furnished
- sheets\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- sheets\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- ☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages \_\_\_\_\_
- ☐ the claims, nos. \_\_\_\_\_
- ☐ the drawings, sheets/figs \_\_\_\_\_
- ☐ the sequence listing (*specify*): \_\_\_\_\_
- ☐ any table(s) related to sequence listing (*specify*): \_\_\_\_\_
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages \_\_\_\_\_
- ☐ the claims, nos. \_\_\_\_\_
- ☐ the drawings, sheets/figs \_\_\_\_\_
- ☐ the sequence listing (*specify*): \_\_\_\_\_
- ☐ any table(s) related to sequence listing (*specify*): \_\_\_\_\_

\* If item 4 applies, some or all of those sheets may be marked "superseded."

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Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement		
<b>1. Statement</b>			
Novelty (N)	Claims	<u>1-13</u>	YES
	Claims		NO
Inventive step (IS)	Claims	<u>1-13</u>	YES
	Claims		NO
Industrial applicability (IA)	Claims	<u>1-13</u>	YES
	Claims		NO
<b>2. Citations and explanations (Rule 70.7)</b>			
<b>I. Claims 1-9:</b>			
1.	<p>EP-A-0 611 129 (D1) describes (see column 5, line 37 to column 10, line 27, column 13, lines 25-41, and figures 1(a)-2(b) and 6(a)) a semiconductor component having the following features: a semiconductor chip (14) with an active area and contact surfaces (15) on an active upper face, a plastics plate (24) into which the semiconductor chip (14) with its rear face and its edge faces is embedded, wherein, together with the upper face of the plastics plate (24), the active upper face of the semiconductor chip (14) forms a planar overall upper face, and a reassignment layer (26) with a reassignment pattern (32) supported on the planar overall upper face, flat reassignment lines from the contact surfaces (15) to contact surfaces outside the semiconductor chip (14) being formed in said reassignment pattern.</p>		
2.	<p>The subject matter of claim 1 differs therefrom in that the semiconductor chip is a sensor chip with a sensor area and electrodes associated therewith,</p>		

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Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability;  
citations and explanations supporting such statement

on the active upper face of which, as well as contact surfaces, printed conductors are also arranged which connect the contact surfaces and electrodes, and in that the upper faces of the contact surfaces (15), together with the upper face of the semiconductor chip and the upper face of the plastics plate, form the planar overall upper face.

3. WO-A-01/17033 (D2) describes (see page 7, line 10 to page 11, line 10 and figures 3-4D) a sensor component having the following features: a sensor chip (20) with a sensor area (22), contact surfaces (24) on the active upper face of the sensor chip (20), wherein the contact surfaces and electrodes of the sensor area must be electrically interconnected, a plastics plate (48) into which the sensor chip (20) with its rear face and its edge faces is embedded, wherein the active upper face of the sensor chip (20) forms, with an upper face of the plastics plate (48), an overall upper face, and a reassignment layer (42) with a reassignment pattern which has reassignment lines (42) from the contact surfaces (24) to external contact surfaces (36) of the sensor component. The reassignment layer is not arranged on the overall upper face.
4. A person skilled in the art wishing to encapsulate a sensor chip knows on the basis of general technical knowledge that the sensor area must be accessible to the signals to be received: that is,

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in the case of electromagnetic radiation, an absorbing layer must not be provided on the sensor area. In the sensor component described in D2 the sensor area is exposed, whereas a wiring layer covering the sensor area, as in D1, would not permit the detection of electromagnetic signals. Therefore, on the basis of general technical knowledge a person skilled in the art would provide an aperture in a reassignment layer formed according to the teaching of D1. Since the connections in a sensor chip such as that described in D2 are also not arranged on the sensor area, the teaching of D1 can be readily adapted to a sensor chip.

5. However, D1 and D2 do not indicate that the upper faces of the contact surfaces also form a planar upper face with the upper face of the semiconductor chip. It is evident from D1 that the contact surfaces are pressed into the adhesive layer, whereas D2 does not describe a planar upper face. Raised contacts on the sensor chip are likewise present in the sensor arrangement shown in D2. A person skilled in the art would therefore receive no inducement to consider a completely flat overall upper face an essential feature. The reasoning advanced by the applicant in the letter of 4 April 2005 can therefore be accepted in respect of the amended claim 1.

6. It follows from the above that claim 1 appears to meet the requirements of PCT Article 33(2) and

Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
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(3) .

7. Dependent claims 2-9 contain all the features of claim 1. Since claim 1 appears to meet the requirements of PCT Article 33(2) and (3), claims 2-9 appear likewise to meet these requirements.

## II. Claims 10-13

1. D1 describes a process in which an adhesive film (12) is inserted into a first moulding tool half, wherein component positions can readily be arranged in rows and columns, semiconductor chips (14) are applied to the component positions by gluing the active upper faces of the chips to the adhesive face (12a) of the adhesive film (12), the moulding tool halves are brought together and a plastics material (24) is injected into the mould while one face of the semiconductor chip (14) is embedded, the plastics material is cured to give a connection plate (24) of plastics material with semiconductor chips and a reassignment layer (26) is applied to the overall upper face of the connection plate.
2. The subject matter of claim 10 differs therefrom in that fabrication of the semiconductor chip from a wafer is described, the semiconductor chips are sensor chips with a sensor area and contact surfaces and the adhesive film is not removed before application of the reassignment layer.

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Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
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|----|---|
| 3. | Whereas the fabrication of semiconductor chips from a wafer is part of general technical knowledge, D2 indicates to a person skilled in the art how sensor chips are encapsulated. Further, the discussion of the amended claim 1 (I.5 above) shows that the adhesive layer plays an important part in fabricating the semiconductor component as per D1. Therefore, the view that a person skilled in the art would simply remove this adhesive layer is not sustainable and the argument to this effect expressed by the applicant in the letter of 4 April 2005 is accepted. |
| 4. | Consequently, claim 10 also appears to meet the requirements of PCT Article 33(2) and (3).  |
| 5. | Dependent claims 11-13 comprise all the features of claim 10. Since claim 10 appears to meet the requirements of PCT Article 33(2) and (3), claims 11-13 appear likewise to meet these requirements.  |

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## Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

1. Independent claims 1 and 10 have not been drafted in the two-part form defined by PCT Rule 6.3(b). However, in the present case the two-part form would appear to be appropriate. Accordingly, the features known in combination from the prior art (D1) should have been placed in the preamble (PCT Rule 6.3(b)(i)) and the remaining features specified in the characterizing part (PCT Rule 6.3(b)(ii)). Contrary to the opinion expressed by the applicant in the letter of 4 April 2005, the characterizing part should have specified that the semiconductor chip is a sensor, thereby delimiting the claim over D1.
2. Contrary to PCT Rule 5.1(a)(ii), the description does not cite D1-D2 or indicate the relevant prior art disclosed therein.